Patent Claims

1. A hydrodynamic modular unit (1)

1.1 having two rotating impellers – a primary impeller (3) and a secondary impeller (4) – which jointly form at least one working chamber (5) that can be filled with operating medium;

1.2 having at least one inlet (10) for operating medium into the toroidal working chamber (5) and at least one outlet (7) out from the toroidal working chamber;

1.3 inlet (6) and outlet (7) are coupled together via a circuit (8);

1.4 having an operating-medium source (10), which can be coupled to the inlet (6) at least indirectly;
characterized by the following features:

1.5 having means (9) for connecting the inlet (6) and the outlet (7) to the operating-medium source (10) simultaneously or in a slightly time-delayed manner.

2. The hydrodynamic modular unit (1) according to claim 1, further characterized by the following features;

2.1 the circuit (8) is designed as a closed circuit;

2.2 the means (9) for connecting the inlet (6) and the outlet (7) to the operating-medium source (10) simultaneously or in a slightly time-delayed manner comprise means (25) for filling and/or draining, which are connected to the closed circuit (8);

2.3 means (25) for filling and/or draining comprise means (26) for creating a pressure for influencing the pressure in the closed circuit.

3. The hydrodynamic modular unit (1) according to claim 2, further characterized in that the means (25) for creating a pressure for influencing the pressure in the closed circuit (8) comprise a pressure-generating device, which applies a static

superimposed pressure on a static operating-medium level (29) of the operating-medium source (10).

4. The hydrodynamic modular unit (1) according to claim 3, further characterized in that the operating-medium source (10) is formed by an operating-medium storage vessel in the form of a tank.

5. The hydrodynamic modular unit (1) according to one of claims 3 and 4, further characterized in that the operating-medium source (10) is formed by an oil sump disposed in the housing of a gear modular unit or of the starting unit.

6. The hydrodynamic modular unit (1) according to one of claims 2 to 5, further characterized in that the means (25) for filling and/or draining are connected to the closed circuit (8) in a liquid-tight and – except for the case of evacuation – pressure-tight manner.

7. The hydrodynamic modular unit (1) according to one of claims 1 to 6, further characterized in that the means (9) for connecting the inlet (6) and the outlet (7) to the operating-medium source (10) simultaneously or in a slightly time-delayed manner comprise at least one valve device (31), arranged in the connection between operating-medium source (10) and outlet (7) from the toroidal working chamber (5), comprising at least two switching positions, a first switching position for connecting the outlet (7) to the operating-medium source (10) and a second for breaking the connection between outlet (7) and operating-medium source (10).

8. The hydrodynamic modular unit (1) according to one of claims 1 to 7, further characterized in that the means (9) for connecting the inlet (6) and the outlet (7) to the operating-medium source (10) simultaneously or in a slightly time-delayed

manner comprise at least one valve device (30), arranged in the connection between operating-medium source (10) and inlet (6) into the toroidal working chamber (5).

9. The hydrodynamic modular unit (1) according to one of claims 1 to 8, further characterized in that the inlet (6) into the working chamber (5) is arranged in the region of the lowest static pressure.

10. The hydrodynamic modular unit (1) according to claim 9, further characterized in that the inlet (6) is arranged in the core chamber (12), which, in terms of its position, can be described by an arrangement in the region of the central diameter d_m of the toroidal working chamber and in the region of the dividing plane between primary impeller (3) and secondary impeller (4).

11. The hydrodynamic modular unit (1) according to claim 10, further characterized in that the core chamber can be described by a diameter around the area bisector when the working chamber (5) is viewed in plan view.

12. The hydrodynamic modular unit (1) according to one of claims 9 to 11, further characterized in that the inlet (6) into the core chamber (12) is arranged on a blade (19) of the blading system (20) of one of the rotating impellers – primary impeller (3) or secondary impeller (4).

13. The hydrodynamic modular unit (1) according to claim 12, further characterized in that the inlet (6) is arranged in the region of the blade end.

14. The hydrodynamic modular unit (1) according to one of claims 12 or 13, further characterized by the following features.

14.1 having an operating-medium delivery or filling chamber (15);

14.2 the operating-medium delivery or filling chamber (15) is connected to the inlet (6) into the working chamber (5) via a channel (14).

15. The hydrodynamic modular unit (1) according to claim 14, further characterized in that the channel (14) is incorporated into a blade (19) of the blading system (20).

16. The hydrodynamic modular unit (1) according to one of claims 1 to 15, further characterized by the following features:

16.1 the operating-medium delivery or filling chamber (15) is arranged on the outer circumference of a blade wheel (3, 4) in the radial direction below the central diameter (d_m);

16.2 the channel (14) extends from the operating-medium delivery or filling chamber (15) through the wall of one of the blade wheels (3, 4) to or through a blade $(17)^1$ of the blading system $(19)^2$ in the direction of the central diameter (d_m) up into the region of the dividing plane up to the blade end.

17. The hydrodynamic modular unit (1) according to one of claims 14 to 16, further characterized in that a plurality of inlets (6) are provided, which are associated with a plurality of channels (14), the individual channels (14) being connected together via a ring channel (17).

18. The hydrodynamic modular unit (1) according to claim 17, further characterized in that the ring channel (17) is formed by delivery or filling chamber (15).

19. The hydrodynamic modular unit (1) according to one of claims 1 to 18, further characterized in that the latter is designed as a hydrodynamic coupling (2), comprising a primary impeller (3), which functions as a pump wheel, and a

secondary impeller (4), which functions as a turbine wheel, the design being free of a guide wheel.

20. A method for accelerating the filling process of a hydrodynamic modular unit, comprising at least two impellers (3, 4), which jointly form a working chamber (5) that can be filled with operating medium, the working chamber (5) being provided with at least one inlet (6) and one outlet (7) and the hydrodynamic modular unit (1) being provided with an operating-medium delivery and/or supply system, comprising at least one operating-medium source (10); characterized by the following features:

- in which, when a signal for a desired filling is present, one of the hydrodynamic modular units (1) will be coupled to the operating-medium source (10) after a standing still or in the drained state for filling of the inlet (6) and the outlet (7) simultaneously or in a time-delayed manner;
- in which, when a flow circuit is established in the working chamber (5) and a parameter of specific magnitude that characterizes at least indirectly the pressure in the working chamber (5) is established, the outlet (7) is decoupled from the operating-medium source (10).

21. The method according to claim 20 in a hydrodynamic modular unit (1) according to one of claims 1 to 19, further characterized in that, when the decoupling is accomplished via a valve device (31), the latter is subjected to an actuating pressure, which exists as a function of the pressure in the working chamber (5).